Public Safety Element
Noise Element
Scenic Highway Element

CITY OF RIO DELL GENERAL PLAN

July, 1975

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and ENVIRONMENTAL RESEARCH CONSULTANTS

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August 15, 1975

City Council
City of Rio Dell
715 Wildwood Avenue
Rio Dell, California 95562

Gentlemen:

The following report is the Public Safety, Noise and Scenic Highway Elements of the Rio Dell General Plan. It incorporates the changes requested when the Council adopted the elements on July 15, 1975. Other changes include rewording to satisfy the comments submitted by the Humboldt County Planning Department, the insertion of a section on implementation at the end of the Public Safety Element, inclusion of a discussion in the Noise Element of Community Noise Equivalent Levels (CNEL) and recently adopted State noise insulation standards, and the addition of Scenic Highway standards and criteria.

We are confident that the implementation of the recommendations on the Public Safety Element will make Rio Dell a safer community. The Noise Element alerts the community to the potential for increased noise levels and indicates what can be done if noise becomes a problem. The Scenic Highway Element considers the options open to the community for protecting and enhancing the scenic attractions in the Rio Dell area.

Oscar Larson and Associates, Environmental Research Consultants and Resource Planning Associates wish to thank you for the opportunity to assist the City of Rio Dell in the preparation of these General Plan Elements. We very much appreciate the assistance given by the City staff and the input provided by the citizens who took an interest in this planning project.

Very truly yours,

OSCAR LARSON & ASSOCIATES

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PUBLIC SAFETY, NOISE AND SCENIC HIGHWAY ELEMENTS INTRODUCTION

Planning Requirement and Guidelines. State Law (Section 65302.2) provides that every city and county in the state prepare and adopt a seismic safety element, a noise element, a safety element and a scenic highway element as part of the General Plan for the jurisdiction. The state law also provides that the Council on Intergovernmental Relations develop guidelines for each of these elements. These guidelines are advisory in nature and are intended to be flexible to meet the varying needs and characteristics of the different cities and counties in the state. This report is intended to satisfy the requirements of the state law and the intent of the CIR guidelines.

Combined Elements. The CIR guidelines suggest that if the subject matter of general plan elements are similar or closely related, combining them may be appropriate. Because of the interrelationship between the Seismic Safety Element and the Safety Elements they are combined under the heading of the Public Safety Element. While this expands the subject range somewhat, it ties together most of the factors that cause or are related to major emergencies or risks to public safety. The subjects considered are the common concern of public safety agencies such as the police department, fire district, and public works department.

The Planning Area. The Scotia Bluffs to the north and east, and the steep terrain to the west and south effectively delimit the development area for Rio Dell. The present city limits encompass almost all of the potential development area. The existing Land Use, Circulation, Open Space and Conservation Elements of the Rio Dell General Plan conform the boundaries of the planning area to these topographical limitations. The planning area used in the development of the Public Safety, Noise and Scenic Highway Elements is identical to that used in the existing General Plan elements. This boundary also coincides with the sewer service area identified for Rio Dell in the adopted Sewer Plan.[1]

Affected Agencies. The city limits include almost all of the planning area, and as the responsible unit of general government, Rio Dell has the primary responsibility for adopting and implementing these General Plan elements. The County of Humboldt is the responsible unit of general government providing police protection, building construction regulation, road improvements and other public services in the unincorporated peripheral areas. Although little area outside of the city limits is included in the planning area, it is anticipated that the county will consider the criteria and standards contained in these elements and cooperate with the City of Rio Dell in their application to areas near the city limits under the county's jurisdiction.

The Rio Dell Fire Protection District and the Rio Dell Elementary School District are special districts serving the planning area. They will be involved in implementation of some of the recommendations contained in the Public Safety and Noise Elements. A few agencies at the state, federal, and local level are affected indirectly or play a secondary role in implementing the recommendations. These agencies are noted where they are affected.

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[1] Humboldt County Water Supply and Waste Water Disposal Comprehensive Plan, Winzler and Kelly, 1973.

Relation to Existing General Plan Elements. The recommendations in a Public Safety, Noise or Scenic Highway study should, under ideal circumstances be part of the basic information used to develop the Land Use, Circulation and other consolidating elements of a General Plan. However the consolidating elements were prepared several years ago. Preparation of the Public Safety, Noise, and Scenic Highway elements at a later date raises the possibility that the data and proposals could uncover problems in the existing plans or conflict with existing policies. Where conclusions in the Public Safety, Noise or Scenic Highway elements raise questions about land use designations or other aspects of existing general plan elements, these questions are noted and the Planning Commission is asked to consider resolving the issue either as part of a general updating of the existing elements or as specific amendments. In most cases the elements herein amplify and support the existing elements and should be helpful to the Planning Commission and the building inspectors in their permit issuing functions. Important considerations in public improvement and maintenance programs are also noted.

Citizen Input. Citizen input has played an important part in the assessment of problems and development of mitigating measures. Interviews with a select group of local residents and a meeting to discuss the preliminary findings with them have provided valuable background information. Their assessment of the important problems in the community, and their reactions to the issues covered in the three elements provided the perspective needed to determine which problems should be given emphasis and which solutions were most likely to be effective under local conditions.

Where there was general consensus among the citizens' committee members their preference has been given considerable weight. Many of the choices were between continuing with the "no action" policy or recommending a specific "action" policy. There were few instances where multiple action proposals were considered feasible. The citizens tended to refrain from recommending action policies which involved expanding governmental bureaucracy, property tax increases, or placing responsibilities, which could be considered onerous, on private parties. This generally conservative approach often contrasted with the consultant's efforts to uncover every possible problem and identify an acceptable solution. The outcome is an attempt at a balanced outlook, not so conservative that legitimate public concerns go unsatisfied, and not so optimistic as to presume that every possibility, however minor, should be considered and resolved.

Report Format. Rather than follow a formal outline that covers each item mentioned in the CIR guidelines, the focus has been shifted to problem identification and the development of feasible solutions. The text of each element is confined to brief elaboration of problems that have been identified and a series of recommendations aimed at correcting significant problems. Most of the relevant technical information is located in the appendices at the end of the element.

Environmental Impacts. The Guidelines for Implementation of the California Environmental Quality Act of 1970, as amended through February 18, 1975, include the adoption of elements of a General Plan as projects subject to the Act and thus to the Guidelines (Section 15037 a 1., Section 15060). Beyond this, the Guidelines are open to interpretation as to whether individual elements of the General Plan must have an Environmental Impact Report or whether a Negative Declaration can be used, especially in this instance, when the elements consist of environmental information and adjustments in administrative policy which taken as a whole will have very little, if any, significant impact on the environment.

The general plan guidelines adopted by the Council on Intergovernmental Relations seem to suggest that an Environmental Impact Report is required, but go on to qualify the application of the CEQA guidelines with the statement, "Given the nature of the document as a long range set of policies and principles, it is not always practical to apply each of the seven points noted in the CEQA with the same degree of specificity that is applied to a specific project. The general plan environmental analysis should take a broader scope than the analysis which is done on a specific project which has specific, well defined limits."

The environmental review procedures adopted by the City of Rio Dell under CEQA provide that the city determine whether or not the project "may involve significant environmental impacts". To provide the City with the necessary data for its initial determination, an environmental assessment has been incorporated into the text of the elements. Important environmental information provided in Appendix A and D regards geologic and noise considerations respectively. Further, the impacts associated with the recommendations are also addressed (please refer to the italicized text). When the assessment covers general impacts relating to more than one recommendation the discussion is located in the introductory section. Specific impact assessments are provided following those recommendations which interject unique considerations not covered by the general introductory assessment, or the appendices.

PUBLIC SAFETY ELEMENT

Content. The Public Safety Element is a composite of the Seismic Safety Element and the Safety Element. According to the state guidelines the Seismic Element should consist of "an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to the effects of seismically induced waves such as tsunamis and seiches." The seismic safety element includes "an appraisal of mudslides, landslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards...".

Purpose. The Government Code identifies the purpose of the Safety Elements as "the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road width, clearances around structures, and geologic hazards mapping in areas of known geologic hazard." The intent of both of these elements is to reduce loss of life, injuries, damage to property and economic and social dislocation.

Hazards. When structures and land uses are situated close together and are utilized and occupied for a variety of purposes the number of possible hazards that could result in damage or destruction of property or injury to the occupants increases dramatically. Both the individual property owner and local government have become involved in various attempts at hazard reduction or the provision of emergency services. Public agencies have assumed responsibility for protection of private property in extreme hazards or where hazards affect many properties or citizens. At the same time the city is responsible for the use and maintenance of publicly owned property, such as streets, public buildings, and parks. Since it is difficult to totally remove all risks from the environment, property owners and the city protect themselves from economic loss by purchasing insurance policies. The greater the risk that is covered the higher the insurance premium. So it behooves both property owners and the city to reduce the risks whenever possible for both humanitarian and economic reasons.

The following series of goals characterizes the general intent of the city and the fire district:

1. To assist private property owners in maintaining safe living, working, and playing conditions by requiring inclusion of safety factors in new structures and land uses, by encouraging reduction of hazards on existing properties through proper maintenance, by maintaining adequate law enforcement and fire supression capability, and by participating with property owners in various types of public works projects aimed at reducing hazards when general public benefit will result.

2. To make public facilities as safe as possible.

3. To achieve the lowest possible fire rating for the city.

4. To cooperate with other agencies to maximize emergency response capability.

5. To minimize the loss of life and property damage in the event of disaster by providing essential services and organizing efficient community response.

Giving substance to these goals requires more precise definition of how far the city should go to achieve these goals. Legal obligations, liability, available resources, and general community attitudes must all be considered. Lack of resources is almost always a critical factor. When the decision hinges on community interests the type of risk involved should be carefully identified.

Risk Assessment. Risks can be classified as avoidable, acceptable and unacceptable. Avoidable risks are those that can be corrected without increased expense, or are risks that people voluntarily assume as part of their work or recreation for its intrinsic stimulation. An acceptable risk is not taken out of choice, but the level of risk is judged minor and not worthy of the extra effort and expense needed to eliminate it. Unacceptable risks are those where the threat to property or persons is judged worthy of action on the part of the property owner or the appropriate public agency.

The intent of the Public Safety Element is to identify any instances where avoidable risks can be reduced by public agencies at little expense and to identify courses of action to reduce unacceptable risks. The recommendations presented herein address the avoidable risks that were uncovered and the unacceptable risks that the City Council feels can be reduced by the suggested actions. Those risks that are not addressed are either considered acceptable or it was determined that the existing response to the risk is all that can be justified of a public agency under the circumstances.

Format. The various aspects of public safety are considered under the following headings: Seismic Hazards, Flooding Hazards and Drainage Problems, Fire Hazards, Traffic and Pedestrian Hazards, and a section on Storage Hazards, Attractive Nuisances and Other Hazards. The last section contains the contingency planning considerations related to disaster preparedness. The italicized paragraphs together with the information provided in the appendix represents the environmental assessment required by the California Environmental Quality Act. Plate 3 shows the location of many of the safety hazards identified in the planning area.

Environmental Assessment. The recommendations of this element are mainly directed at the establishment of policies that will mitigate the impacts of natural hazards on existing structures or that will regulate future construction and installations to reduce the likelihood of adverse impacts due to natural or man-made disasters. Many of the specific actions, or

projects that are suggested include permit procedures, structural repair work or field studies which as individual projects would be exempt as ministerial projects from the EIR requirements of CEQA 70 (Sections 15073a). However, as a routine planning policy, each recommendation was considered for its direct and indirect impacts upon the air, water, earth, the plants and wildlife as well as upon the economic and social well-being of the community and its residents. Each recommendation was considered in terms of unavoidable impacts, possible mitigation measures, short term uses, long term productivity and its resource and energy requirements. Alternatives are discussed if pertinent. The few remaining projects, though calling for a commitment of resources, are also safety maintenance measures akin to the emergency actions exemplified by Section 15017c of the CEQA guidelines as amended to 18 February, 1975.

SEISMIC HAZARDS

Earthquakes. The western portions of Humboldt County, and adjoining offshore areas, are regions of moderate to high seismicity. Plate 1 shows the location of major faults. Except for the Cape Mendocino area, no obvious patterns emerge tying earthquakes to particular faults of shear zones. The only known historical surface rupture associated with a fault in the area was in 1906 along the San Andreas Fault in southern Humboldt County, at Shelter Cove and Upper Mattole. The frequent earthquakes south and southwest of Ferndale are taken to indicate modern activity along the Cape Mendocino-False Cape shear zone.

Elsewhere in the area no faults can be demonstrated to be unequivocally active, but several should be viewed with considerable suspicion. Recognizing that the data is sparse the approach identified in the appendix has been used to estimate the maximum probable earthquake (the strongest earthquake likely to occur on a given major fault during any 100-year period). The magnitude of such an event is estimated at 8.0 (Richter Scale) on the southern segment of the San Andreas fault and 7.3 on the other three fault zones in the southern Humboldt County seismic area. The four faults in the northern Humboldt County seismic area are estimated at 6.4 for the maximum probable event.

From the estimates of magnitude it is possible to predict the maximum and repeatable strong bedrock acceleration that would be felt in the Rio Dell planning area from any of the faults (See Table 1 in Appendix A). The maximum bedrock acceleration estimates range from .09 g to .60 g and the repeatable strong bedrock acceleration estimates range from .06 g to .39 g.[1] Higher intensities would be expected in areas underlain by river alluvium, unstable landslide terrain or fill. The higher figures are due to the proximity of the Cape Mendocino-False Cape shear zone southwest of the planning area.

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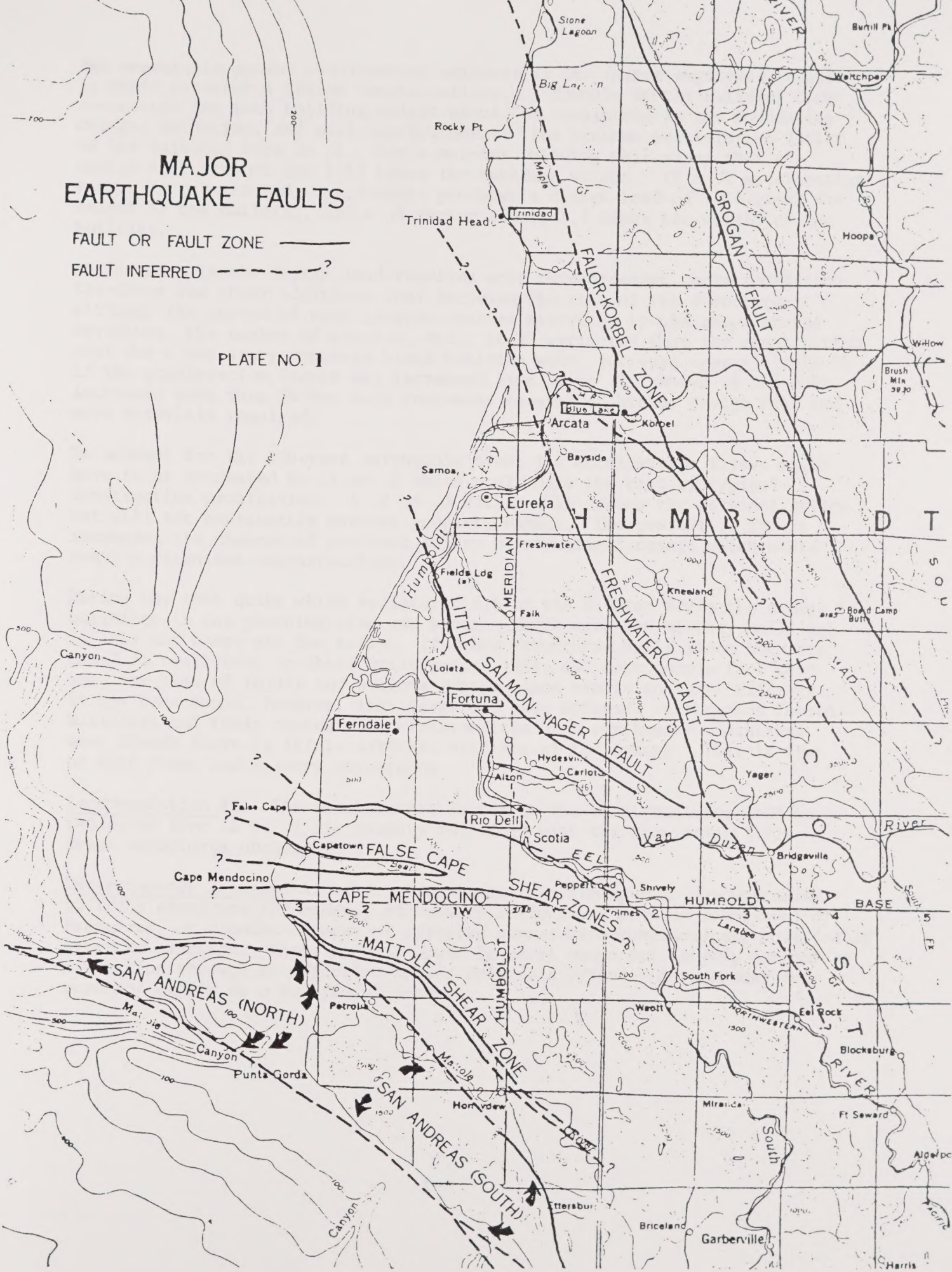
1 %g is the instantaneous acceleration in any direction imparted to bedrock by the seismic shock wave. It is related numerically to the acceleration imparted to a freely falling object by the pull of gravity.


MAJOR
EARTHQUAKE FAULTS
FAULT OR FAULT ZONE
FAULT INFERRED
PLATE NO. 1
Stone Lagoon
Big Lagoon
Rocky Pt
Trinidad Head
Trinidad
Maple Cr
FALOR-KORBEL ZONE
GROGAN FAULT
Burnt Pk
Weitchpec
Hoopa
Willow
Brush Mtn
Blue Lake
Arcata
Korbel
Bayside
Samoa
Eureka
HUMBOLDT
Freshwater
Fields Ldg
MERIDIAN
Falk
Kneeland
FRESHWATER FAULT
Board Camp Butte
Loleta
LITTLE SALMON-YAGER FAULT
Fortuna
Ferndale
Hydesville
Carlotta
Alton
Yager
False Cape
Rio Dell
Scotia
Capetown
FALSE CAPE
Cape Mendocino
CAPE MENDOCINO SHEAR ZONES
EEL
Van Duzen
Bridgeville
Pepperwood
Shively
HUMBOLDT BASE
Carnes
Larabee
MATTOLE SHEAR ZONE
HUMBOLDT
SAN ANDREAS (NORTH)
Petrolia
South Fork
Weott
Eel Rock
Blocksburg
Canyon
Punta Gorda
Honeydew
Mattole
SAN ANDREAS (SOUTH)
Miranda
Ft Seward
South
Ettersburg
Briceland
Garberville
Harris
Canyon

The repeatable ground acceleration estimate is the factor engineers include in their structural design considerations. A formula in the Building Code determines how much building weight should be considered in the foundation design, anchoring, and wall reinforcement. The minimum acceleration factor in the Building Code is .1. For a masonry building this means that the design must account for 1.13 times the building weight. If a .2 acceleration factor is substituted, the formula produces a design load of 1.26 times the weight of the building, and a .3 factor equals 1.4 times the weight of the building.

An increase in the design load requires more reinforcement, more foundation tie-downs and other additives that increase the cost of the structure. Although the degree of cost increase varies according to the shape of the structure, the number of stories, etc., it is estimated that the construction cost for a one story concrete block building would increase approximately 5% if the acceleration factor was increased from .1 to .2. Above .2 the cost increases more than 5% for each increment because of higher design cost and more materials required.

To account for the 100-year earthquake event the acceleration figure would have to be increased to .4 or .5 which would make the cost of typical construction prohibitive. A .2 or .3 factor will reduce the personal injury but will not necessarily prevent property damage. The present .1 figure increases the chances of personal injury or structural damage which would require extensive reconstruction.

During the 1954 quake which registered 6.5 on the Richter Scale the damage to buildings in the planning area was minor. There were few masonry buildings in 1954 and there are few today. If frame structures built since then are equal in resiliency to those built before 1954, and most people feel they are, the risk of injury and serious damage seems remote to local citizens. It has been found, however, that large and even moderate earthquakes loosen buildings and their capacity to withstand the next earthquake diminishes even though there is little external evidence of the damage. This is true of both frame and masonry structures.

Recommendation #1. The acceleration factor in the local Building Code be increased from .1 to .2 for masonry buildings with the requirements for frame structures unchanged.

Environmental Assessment. This alternative of a stronger policy upgrading building standards for masonry structures would cause a minor commitment of resources, an economic stress on affected owners with concommitant, politically oriented reaction. These impacts would be short range but largely subject to mitigation through an effective public relations effort. An increase in personal safety is a beneficial impact.

Recommendation #2. The Fire District staff or building inspector should warn property owners to inspect flues and chimneys for damage after moderate and large earthquakes. Also, occupied structures which appear to have been seriously damaged by an earthquake should be inspected and evacuation required if they are found unsafe.

Environmental Assessment. This policy is entirely aimed at mitigating the adverse impacts of natural disasters.

Slope Instability. Mass movement of material on hillsides is a major accompaniment of moderate and strong earthquakes. This may be in the form of landslides, rock avalanches, mud and debris flows, or other types of slope failure. Steep natural or artificial slopes and high water content favor such failure.

Plate 2 delineates the slope areas in the Rio Dell planning area which appear to have stability problems. The delineations are generalized and serve as a caution to those designing highways, subdivisions or structures that further slope stability investigation is warranted.

The hilly area in the western portion of the planning area is characterized as generally unstable. The banks of the Eel River, Dean Creek and other minor drainageways also appear to be unstable. Most of the present townsite is categorized as stable due to the gradual slope. Liquefaction, lurching, cracking, and differential subsidence are not considered likely. These types of ground failure are discussed in more detail in Appendix A.

Recommendation #3. Before any major excavation, or the construction of dwellings, public facilities, or commercial and industrial buildings is permitted by the city within the areas of low and moderate stability, special studies by a registered soil engineer or licensed geologist should be undertaken by the developer and necessary provision be made for reducing landslide risk.

Note: The County is presently utilizing Chapter 70 of the Uniform Building Code dealing with grading, and enforcement of County Ordinance #596 (which requires developers to provide appropriate soil studies for slopes in excess of 15%) to reduce the potential for landslides outside of the city limits.

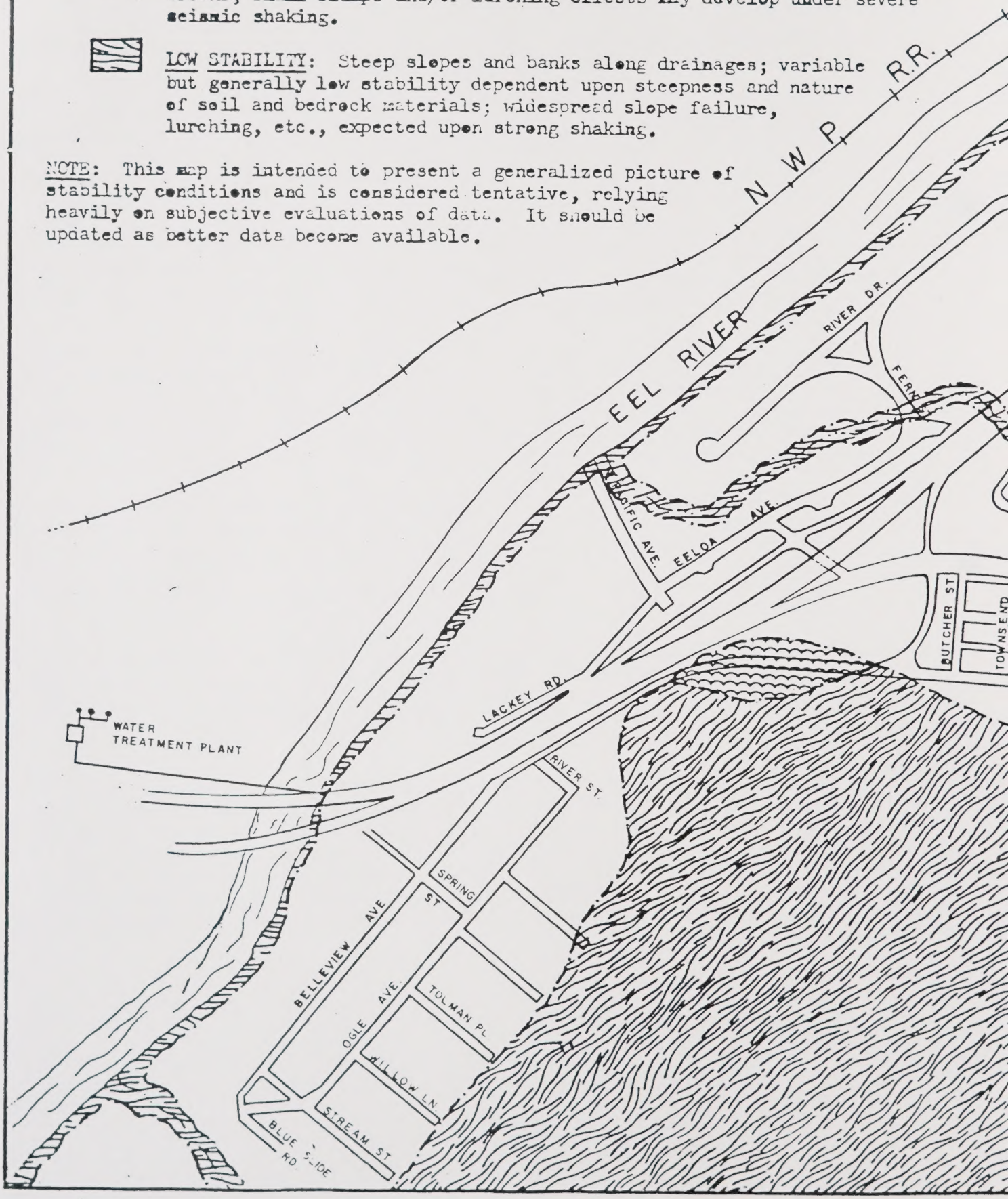
Environmental Assessment. This recommendation is the first step in the mitigation of a natural hazard. Adoption of this recommendation will result in an expenditure by affected property owners. Impacts may arise from the actions that flow from the study. These impacts may be in the form of restrictions on buildings or added construction requirements which will be unpopular with those affected. Long range saving may result in connection with the avoidance of damage to structures and of soil loss through erosion of cut banks.

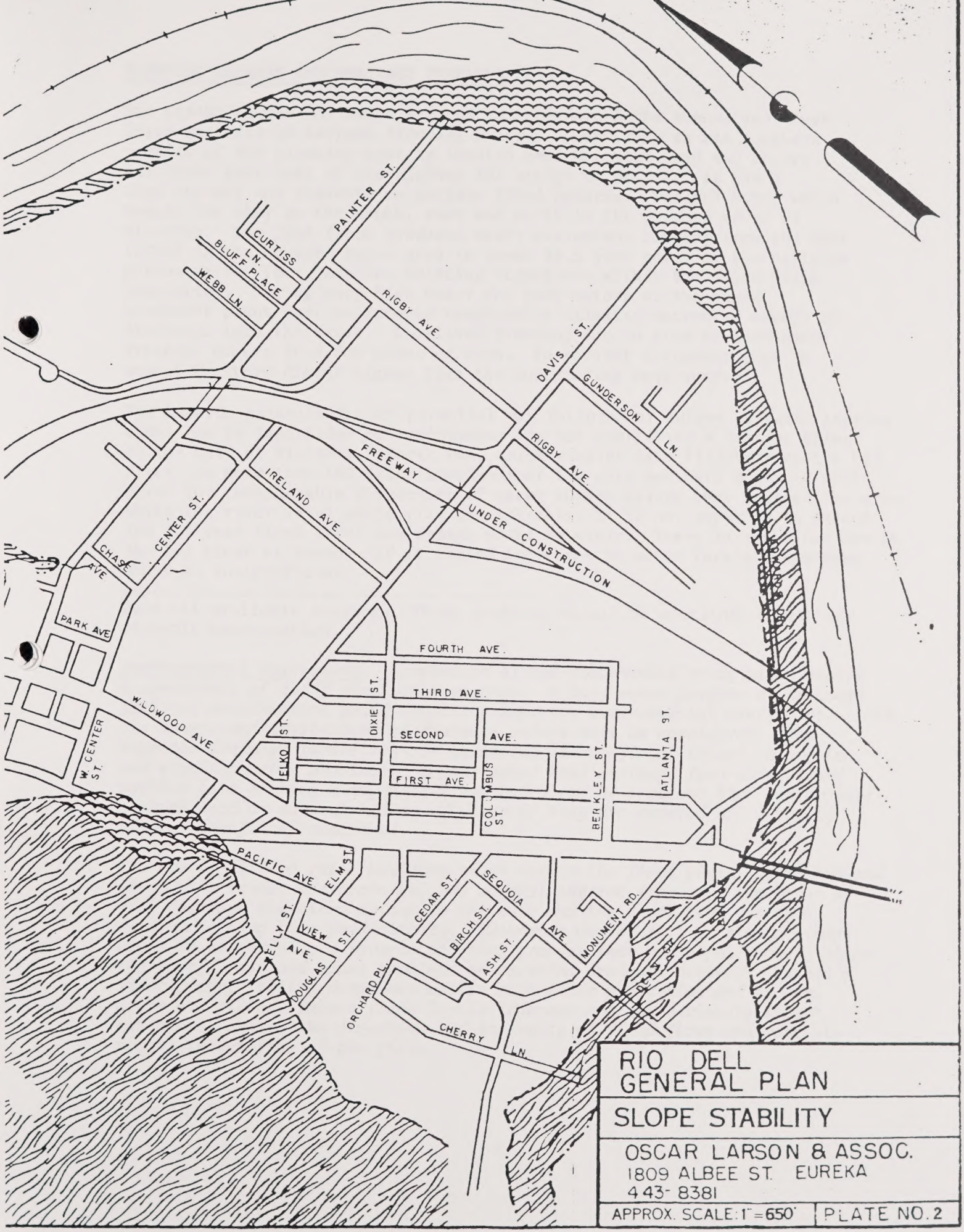
HIGH STABILITY: Ground surfaces are flat to gently inclined; no possibility significant slope failure; unknown but probably negligible possibility of liquefaction, lurching, or differential subsidence.

MODERATE STABILITY: Moderate slopes or areas marginal to steep topographic breaks; small slumps and/or lurching effects may develop under severe seismic shaking.

LOW STABILITY: Steep slopes and banks along drainages; variable but generally low stability dependent upon steepness and nature of soil and bedrock materials; widespread slope failure, lurching, etc., expected upon strong shaking.

NOTE: This map is intended to present a generalized picture of stability conditions and is considered tentative, relying heavily on subjective evaluations of data. It should be updated as better data become available.




PAINTER ST.
CURTISS LN.
BLUFF PLACE
WEBB LN.
RIGBY AVE
DAVIS ST.
GUNDERSON LN.
RIGBY AVE
FREEWAY UNDER CONSTRUCTION
IRELAND AVE.
CENTER ST.
CHASE AVE
PARK AVE
FOURTH AVE.
THIRD AVE.
DIXIE ST.
SECOND AVE.
WILDWOOD AVE
W. CENTER ST.
ELKO ST.
FIRST AVE
COLUMBUS ST
BERKLEY ST.
ATLANTA ST
PACIFIC AVE
ELM ST.
CEDAR ST
SEQUOIA AVE
MONUMENT RD.
ELLY ST.
VIEW ST.
BIRCH ST.
ASH ST.
DOUGLAS AVE
ORCHARD PL.
CHERRY LN.
RIO DELL
GENERAL PLAN
SLOPE STABILITY
OSCAR LARSON & ASSOC.
1809 ALBEE ST. EUREKA
443-8381
APPROX. SCALE: 1" = 650'
PLATE NO. 2

FLOODING HAZARDS AND DRAINAGE PROBLEMS

The stream in the northwest area of town between Eeloa Avenue and River Drive presents no serious flooding hazard. Dean Creek in the southern portion of the planning area is located near Monument Road and enters Eel River just west of the Highway 101 bridge to Scotia. It has a deep channel and presents no serious flood hazards. The Eel River which bounds the city on the south, east and north is the primary cause of flooding. The 1964 flood produced water elevations ranging from 106 feet (USGS) in the Edwards Drive area to about 89.5 feet north of the Bellview Avenue area. There are few existing structures within the flood plain boundaries. During very high water the pump motors at the sewage treatment plant must be removed temporarily allowing untreated sewage to discharge into the river. Localized flooding due to slow or inadequate drainage occurs in a few areas of town. In several instances this is caused by storm drains higher than the surrounding road surface.

The hazards associated with potential dam failures or surges of water topping a dam due to landslides or earthquakes are not considered a serious threat to the City of Rio Dell. Scott Dam, which creates Lake Pillsbury on the Eel River, is more than 100 miles southeast of the city and this distance would allow for considerable dispersion of water surges before they reached the area. While the river level would rise considerably, it is not expected to exceed the 100-year flood level and damage would be minor. There is a shallow dam on the Eel River at Benbow. If it failed increases in water levels downstream would be insignificant.

Implementation program should be [illegible] from all available sources. These projects should be coordinated with any sidewalk construction.

Environmental Assessment. Completion of the recommended study will involve a commitment of staff time and resources. A long range program of drainage facility construction would require a separate environmental assessment. Both the source and destination of drainage waters must be considered. The improved drainage facilities can constitute a beneficial impact on erosion and standing water problems. On the other hand drainage from streets and parking lots contain heavy metals and petroleum by-products that can produce a shock load on natural bodies of water if they are carried off directly without benefit of treatment.

The use of fill to raise building sites within the flood plain, or in lowland areas with inadequate drainage, has several adverse impacts. Placement of fill destroys the microhabitat on the site and the short term use then supercedes long term productivity. Extensive use of fill in slow drainage areas is essentially a reverse ditching process that may significantly alter the runoff rate and cause problems in existing drainage ditches. Within a flood plain, filling displaces waters onto other properties and as more areas are filled, future flood levels increase and can seriously impact new areas, change the direction and intensity of flood flows and possibly negate the utility of the fill.

Although construction of buildings on raised foundations displaces less floodwater storage area, many of the same impacts are created. Zoning to limit construction in the flood plain would alleviate flooding hazards but is unpopular with owners of affected lands.

Recommendation #6. Where steep slopes are the only feasible location for access roads into hillside areas subject to considerable residential development such roads should include drainage facilities adequate to handle potential runoff.

Environmental Assessment. Poorly constructed and inadequately maintained roads are a major factor in hillside slippage, erosion, and surface water degradation. Grade, crown, drainage and surface type all effect the drainage patterns. Inadequate roads are a major flaw in many subdivisions. County or municipal governments often find that they are saddled with an inordinate maintenance expense after accepting substandard roads in subdivision projects. Establishing high standards and enforcing them constitute the best mitigation against these hazards. An alternative is zoning against construction on steep slopes or in locations where access roads must be built on steep slopes. This alternative will meet resistance from the owners of steep land who plan to sell or to subdivide. Land owners tend to be an important power element in a small community. As a group they are likely to be more amenable to strict standards than to total restrictions on construction.

Recommendation #7. Storm drainage inlets within roadways causing drainage problems should be reinstalled at the appropriate grade.

Environmental Assessment. Improvement of drainage inlets will cause a minor commitment of materials and energy and will cause a temporary degradation of air quality from asphalt fumes and equipment exhaust.

FIRE HAZARDS

The Rio Dell Fire District serves the area with a 35 man volunteer staff. Truck units consist of one 750 gallon tanker and one 1000 gallon tanker. Backup help is provided by Fortuna and Scotia. The State Division of Forestry also provides assistance. The Fire Department has one emergency generator in case of power outage and emergency communications are carried over police radio. There are eight emergency cisterns of 12,000 gallons each located under the streets, in areas with insufficient fire hydrants particularly the Wildwood Avenue business district. The high density of old wood frame structures and the lack of fire resistive construction in and around the commercial area represent a fire hazard. Narrow or dead end streets in several areas would make access by fire equipment difficult. The Sequoia Avenue extension is only accessible to the smaller fire truck because of load limits on the old bridge which provides access over Dean Creek into the area.

Emergency response has been hampered by the fact that address numbering of residences and buildings is not always consistent.

Environmental Assessment. Fire hazards are frequently man-made in origin, though natural fires do occur. Fire has tremendous social and economic impacts which are more obvious than the impacts upon the natural environment. Habitat loss and the loss of individual organisms is a natural phenomenon which nature promptly restores. Like flooding, the frequency and intensity of fires in the natural environment is increased by human activity and can thus threaten already restricted population of animals or plants.

Losses to man from fire include the direct losses of property and life and the indirect losses to income through the destruction of income producing resources as well as the increased tax burden of fire fighting and restoration. Many of the recommendations of the public safety elements that deal with fire are policy and inspection measures designed to minimize the fire hazard and would have impact only in the sense of the negative effect of their absence. Other recommendations which have greater impacts such as improved water system supply will have to be judged against the extreme severity of the fire hazard upon the human population.

Recommendation #8. The Fire District should conduct an annual inspection of the downtown commercial buildings to identify risks that can be eliminated by the property owners.

Recommendation #9. The City of Rio Dell should ensure good fire protection by improving the water and hydrant system wherever necessary to eliminate dead end mains, provide adequate valving, provide a minimum of 1,500 gallons per minute from any single hydrant at the maximum daily residential consumption rate, provide hydrants within 300 feet of any point, and provide adequate storage for the types of fire encountered. Until hydrants can be installed the cisterns should be retained as an emergency water source for fire fighting.

Environmental Assessment. Adoption of this policy will involve a minor commitment of staff time to determine if any of the needs outlined are not presently satisfied. If only minor improvements are required the impact will consist mostly of a commitment of energy and resources. If the project requires working on buried pipe line additional impacts will be equipment noise, and dust, which are temporary and can be minimized by careful construction practices. If a major revision of the water system is required to satisfy the policy, a separate study including an environmental assessment will be required.

Recommendation #10. Enforcement of the Building Code, the Housing Code and Title 19 of the California Administrative Code and the City Weed Abatement Ordinance should be given high priority to ensure adequate new construction and the correction of unsafe fire conditions. Fire limits should be established in accordance with the American Insurance Association's Guidelines of September, 1956 (see Appendix B).

Recommendation #11. The city should consider adopting a special code governing rehabilitation of older structures including only the necessary provisions for the health and safety of residents and nearby property. These include provision of necessary exits, fire walls and fire extinguishers in order to accomplish primary rehabilitation objectives.

The cost of full compliance with present building codes discourages many property owners from making needed repairs. Some of the current requirements might be given lower local priority.

Environmental Assessment. The social value of historical buildings is presently held to be high. The economic value of preserving moderate cost older homes is also considered important. When building codes hinder the rehabilitation of such buildings, historical and economic resources can be lost or damaged. This loss is frequently accompanied by political action and community dissension. The physical risks associated with meeting lesser standards are generally felt to be less than the loss of the resource through the neglect that follows an economic inability to meet the higher standards.

Recommendation #12. In order to achieve the lowest possible fire rating the city should support the fire department in its efforts to maintain the highest possible levels of fire protection, including man power recruitment and training, purchase and maintenance of fire fighting equipment, mutual aid agreements, adequate alarm systems and disaster communication equipment, and the fire hazard reduction and preparedness recommendations contained in the Public Safety Element.

Recommendation #13. Fire hydrants should be installed in all areas lacking them, but particularly where cisterns are not convenient to provide an emergency water source.

Environmental Assessment. The installation of pipelines and hydrants will have a short-term, direct impact upon the soil being trenched, upon the air being contaminated by equipment exhaust and by construction noise. These impacts are common, familiar and generally considered acceptable as a necessary minor evil attendant upon the larger benefit.

TRAFFIC AND PEDESTRIAN HAZARDS

The major traffic accident area is along Wildwood Avenue from the south bridge to the intersection of Monument Road. Other intersections along Wildwood also experience accidents due mainly to limited visibility. Double parking of trucks for loading and unloading at businesses contributes to congestion and also causes some accidents. When the freeway bypass is operational the through traffic on Wildwood will drop from the present 8,500 vehicles per day to around 2,000 vehicles per day and this should lessen congestions and reduce traffic accidents in these troublesome areas. It will also make it easier for pedestrians to cross Wildwood Avenue.

In general city streets are narrow, lack proper signing, and some have open ditches adjacent to the roadway. Sight obstructions exist at intersections in residential areas due to fences and hedges too close to the intersection. Many areas lack sidewalks so that pedestrians must walk in the narrow travel lane. This is true on Center Avenue near the elementary school in particular. Insufficient night lighting contributes to driving and pedestrian hazards in several areas.

Environmental Assessment. Traffic hazards like fire hazards are often man made and a by-product of the modern mode of life. While there are impacts associated with construction and maintenance of roads, the prime concern with traffic and roadway problems might well be a concern with the patterns of energy use. The rapid increase in cost of energy supplies and the postulated shortage of petroleum and other fossil fuel sources of energy make it pertinent to examine traffic problems from the use end rather than supply end. Traffic should be studied to determine the need for improvement in flow rather than assuming a need. Restrictions in flow may be regarded as a planning tool for restricting energy expenditure through discouraging use. Where transportation needs are found, consideration should be given to solutions other than the increase in flow. Alternatives such as diversification and dispersion of goods outlets (shopping centers), public transportation, etc., may now be more attractive than increasing the traditional methods of individual personal transportation.

Recommendations which improve the level of safety of the existing traffic should be considered as direct beneficial social impacts.

Recommendation #14. Where existing streets are narrow, on-street parking should be controlled so that emergency vehicles will be able to pass at all times.

Environmental Assessment. The initial impacts will be commitment of the resources necessary to study and propose solutions to the problems cited. Until the specific nature of the solutions are known it is not possible to assess environmental impacts.

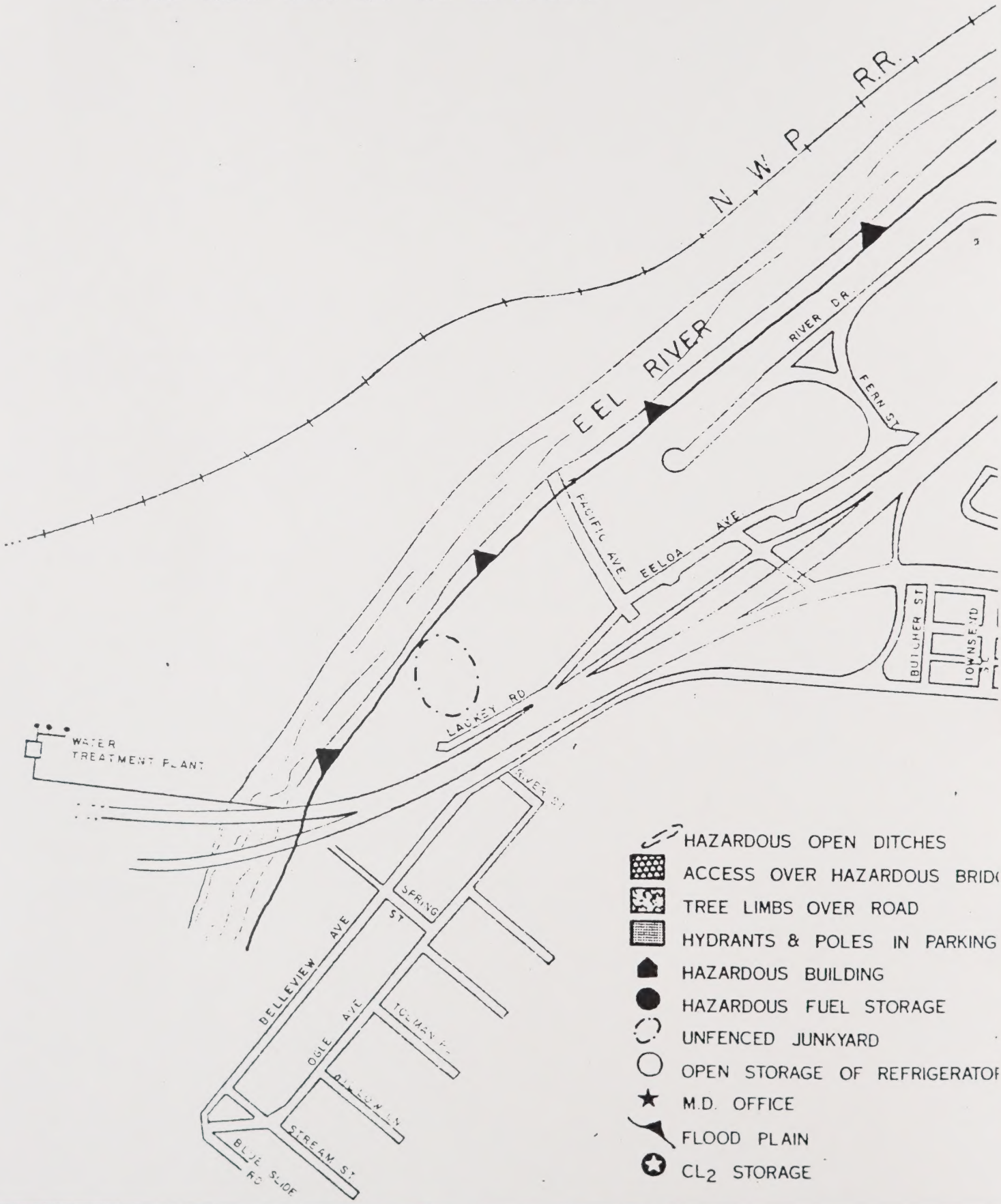
Recommendation #15. Where existing dead end streets are more than 300 feet in length and lack adequate turn around area, means of providing such an area should be explored by the city and the Fire District.

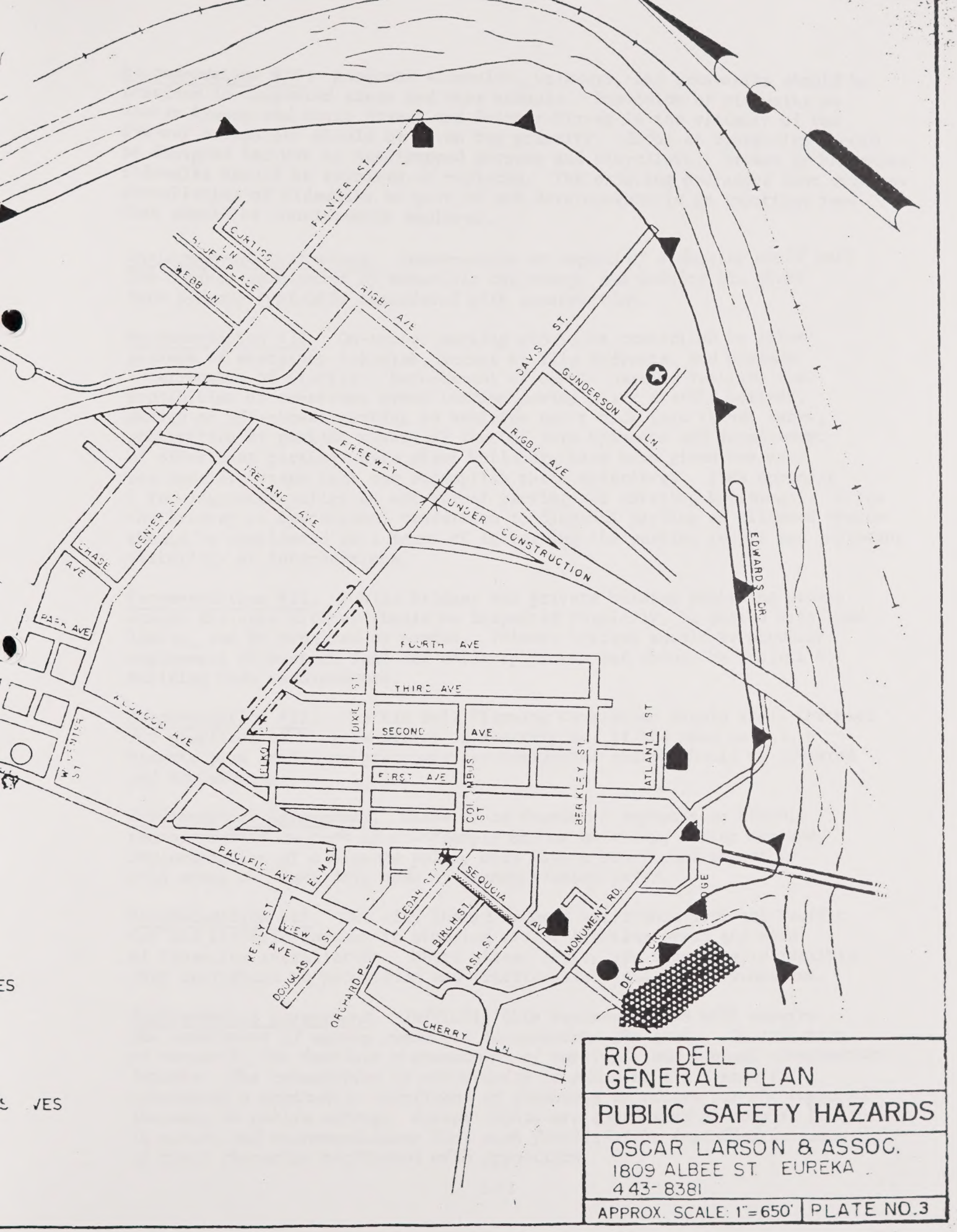
Recommendation #16. Where streets parallel drainage ditches, steep topography, or where street curves are difficult to see, reflective markers should be provided along the edge of the road. Orchard Street in particular would benefit from such treatment.

Recommendation #17. Adequate sight distance should be provided at every intersection particularly in congested areas. Vegetation, fences, buildings, and on-street parking should not be allowed to block visibility. Visibility problems at major Wildwood Avenue intersections and in the residential areas within a few blocks of downtown should be given priority attention.

Recommendation #18. Center line striping, warning signs and speed limit signs should be provided wherever necessary especially on rural roads, and in congested areas.

FLOOD DATA FROM U.S. ARMY CORPS OF ENGINEERS
DEC 1964 FLOOD PLAIN MAP FILE NO 60-53-10





RIO DELL
GENERAL PLAN

PUBLIC SAFETY HAZARDS

OSCAR LARSON & ASSOC.
1809 ALBEE ST. EUREKA
443-8381

APPROX. SCALE: 1"=650' | PLATE NO.3

Recommendation #19. Adequate sidewalks, walkways, and crosswalks should be provided in congested areas and near schools. Provision of sidewalks on Center Avenue and Davis Street and Painter Street in the vicinity of the freeway overpasses should be given top priority. Curbs at crosswalks should be designed for use by handicapped persons and bicyclists. Broken or hazardous sidewalks should be repaired or replaced. The existing ordinance that requires installation of sidewalks as part of new developments is an important tool that should be consistently employed.

Environmental Assessment. Construction or repair of sidewalks would call for a minor commitment of materials and energy and involve the short term impacts typically associated with construction.

Recommendation #20. On-street parking should be controlled to allow passage of emergency vehicles, access to fire hydrants, and minimum interruption of traffic. Enforcement of double parking restrictions, prohibition of on-street truck loading during heavy traffic periods, design of off-street parking so vehicles don't back into travel lanes, prohibition of parking within 15 feet of fire hydrants and requirement of off-street parking where older buildings have been given new uses are specific steps that can accomplish these objectives. (See Appendix C for suggested policy on off-street parking for existing buildings). After the freeway is operational conversion to diagonal parking on Wildwood Avenue should be considered as a means of increasing the parking supply and improving visibility at intersections.

Recommendation #21. Public bridges and private bridges providing access across drainage ditches should be inspected regularly, be posted with load limits, and be repaired as needed. Private bridges should be properly engineered to support fuel and delivery trucks and should be subject to Building Code requirements.

Recommendation #22. The Rio Dell Planning Commission should study the need for provision of bicycle routes in the city and if the need exists, a bicycle plan including proposals for designated routes should be prepared and implemented.

Environmental Assessment. There is an increased emphasis on bicycle transportation as part of a lifestyle and as an energy saving measure. Implementation of a bicycle policy will have a beneficial impact in both areas and make this mode of transportation safer.

Recommendation #23. The city should request assistance from the Pacific Gas and Electric Company in studying street lighting needs and means of financing installation. Where street lights are economically feasible they contribute to pedestrian and traffic safety and reduce vandalism.

Environmental Assessment. Initially this recommendation will require the commitment of agency resources to undertake the study. Installation of street lights involves a commitment of materials and typical construction impacts. The consumption of electricity to energize the system is considered a worthwhile commitment of resources in return for the expected increase in public safety. Street lights are considered by many to be urban in nature and recommendations that such facilities be installed in areas of rural character might meet with opposition.

STORAGE HAZARDS, ATTRACTIVE NUISANCES AND OTHER HAZARDS

Junk piles and other debris are obvious in several areas of town. One pile of debris adjacent to a service station could cause a spontaneous combustion fire. Other debris consists of old car bodies, scrap metal, refrigerators and other equipment accessible to children. A fuel storage tank along Sequoia Avenue has no access restrictions and is not marked as flammable material.

Several buildings are dangerous attractive nuisances and the city police have had to remove young children from the premises. Some of these buildings are structurally weak in addition to being fire hazards. Several buildings have inadequate fireplace/chimney and flue construction along with instances of inadequate wiring and service panels. Fire separations and fire resisting construction is substandard especially in the downtown area. A few buildings have awnings or projecting signs that should be checked for structural strength.

Power poles on Ogle Avenue appear to be overloaded with electrical lines. In several cases private bridges providing access over drainage ditches appear to have excessive deflection and may be in need of structural repair. The bridge over Dean Creek to Sequoia Avenue appears to have many rotten spots and insufficient member connections (bridge hazards are covered by a recommendation in the Traffic Hazards section). The two streams draining the area are hazardous to children since the banks are unprotected and steep. During rainy periods the water is deep and very swift. Dead trees and limbs project over street rights-of-way, and conflicts between tree limbs and power lines were noted. The only road connecting the Bellview area to the town is threatened by a slide and excessive amounts of mud and water flow onto the roadway during periods of heavy rainfall. Roadside drainage in several areas is eroding the edge of the roadway.

The city's water supply is from three wells on the north side of the Eel River. During the 1964 flood the water supply was severed when the bridge across the Eel River was destroyed. Provision should be made for an alternate water source. The best solution is to connect the Rio Dell water system with the Scotia water system, and to provide storage capability within the city of about four days supply. Presently the city has one tank of 250,000 gallons which provides only one day's water supply for the city.

The lack of adequate valving throughout the water supply system makes it difficult to save the water supply in the event of broken lines. Many of the main lines are undersized and provide insufficient flows from some hydrants.

Although some of the conditions described in the following recommendations were not found in the community, policy recommendations are included to preclude hazardous situations from developing in the future.

Recommendation #24. Before issuance of permits for new construction or establishment of new land uses, particularly where explosives and hazardous chemicals are involved, the city should refer the application to the Fire District to ensure that all fire safety concerns are satisfied.

Recommendation #25. Land uses which include storage and transfer of hazardous materials should include special provision for accidental spills which ensure that the hazard will be contained on the premises and not be injected into the air or nearby drainage facilities or affect important traffic corridors, schools, or residential areas.

Recommendation #26. Any outdoor storage of fuels, debris, junk, equipment, appliances and wrecked vehicles should be completely fenced to prevent unwarranted access. Warning signs should be provided at outdoor fuel storage locations, and quantities of gasoline should be stored underground. Vehicles carrying hazardous materials should not be permitted to park in residential areas.

Recommendation #27. An annual cleanup program should be instituted to encourage residents to remove debris, old appliances and other hazardous items.

Recommendation #28. Critical public services such as the water system, sewer system, fire and police protection are essential to risk reduction and adequate emergency response. They should be adequately staffed and equipped at all times. The water source and storage facility and the sewer treatment plant should be fenced or guarded to prohibit unwarranted access. Steps should be taken to minimize the possibility of accidental sewage discharges or bypassing of the system during high water.

Environmental Assessment. Accidental discharge of sewage during floods or from damaged pipelines are major health and environmental hazards. Of primary concern is the contamination of water and food supplies by fecal bacteria and viruses. Perhaps the most insidious secondary threat comes from undetected leaks which pose not only the problem of contamination by pathogenic organisms but pollution of surface waters by an excess of organic materials.

Recommendation #29. The water system for the city is substandard and should be rebuilt. Storage, valving, main size and distribution, and emergency supply provisions are all inadequate. Connection to the Scotia water system as recommended in the adopted Humboldt County Water Supply Plan (1973) should be accomplished at the earliest opportunity.

Environmental Assessment. Rebuilding the Rio Dell water system will have a series of impacts; beneficial and adverse, direct and indirect and should be carefully analysed. The water sources possible should be studied in terms of affects on water table or stream flows. The physical changes in the water supply will have to be considered in terms of secondary effects such as effect on area wells, effects on migrating fish, effects on the waste carrying capacity of streams, and the effects on stream bed sedimentation and bank erosion. The method of storage will have to be

considered in terms of seismic stability, potential for leakage both large scale and small scale, and effects on the landscape and view. Construction of pipelines should be examined from the point of view of service interruption, impacts of installation, and possible traffic disruption.

Any public utility project must consider the matter of growth inducement and population relocation. If Rio Dell increases the capacity of its water system, will it open new areas in and around the community to more construction or higher densities of residences? The community should consider the question of the desireability of growth and the type of growth desired.

Recommendation #30. The city should work with local insurance agents, and fire district staff to develop a program which provides a free home safety inspection at the request of the homeowner. Such inspections could include review of wiring, emergency exits, foundation conditions, etc. and provide the homeowner with ideas on how needed changes could be made at minimum expense.

Recommendation #31. The Building Code provisions which authorize condemnation by the city of structures that are public hazards should be utilized when necessary to persuade hesitant owners to repair or demolish the structure.

Environmental Assessment. Condemnation proceedings will lead to economic impacts for the owners especially if the buildings are being utilized commercially. There may also be a tax revenue loss. Beneficial aesthetic impacts can also be expected. Replacement of hazardous structures or the restoration of open space will represent a benefit to long term productivity at the expense of short term use.

Recommendation #32. Inspection of power poles should be included in the regular city street inspection program. The appropriate utility should be notified when hazardous conditions are found.

Recommendation #33. All signs projecting over public right-of-ways represent a potential public liability and should be inspected regularly to ensure public safety and proper spacing from utility lines. Any dangerous materials used in the sign, such as glass, should be replaced.

Recommendation #34. The city should establish a periodic program to remove tree limbs and other growth projecting over public rights-of-way that represent a hazard. When tree limbs conflict with power lines, the appropriate utility should be notified of the hazardous condition.

Environmental Assessment. Tree pruning will involve public expense, energy utilization and disposal of the pruned material.

Recommendation #35. Erosion caused by roadside drainage should be corrected before costly repairs to street pavement or sidewalks are necessary.

Recommendation #36. Existing school playgrounds and city parks should be inspected and safety hazards be corrected. Monkey bars and asphalt playground surfaces are notorious accident hazards.

Recommendation #37. The city should request that its public liability insurance carrier conduct an annual inspection of all public buildings and facilities to uncover ways the city can reduce its liability and improve working conditions for city employees.

Recommendation #38. Fire hydrants and power poles should be located far enough back from the curb so that they will not be damaged by, or cause damage to, vehicles.

DISASTER PREPAREDNESS

Most of the preceeding recommendations are directed at correcting, or being prepared for small scale hazardous situations. This section presents consideration of the steps that can be taken to cope with major emergencies such as a major earthquake, extensive flooding, or large scale threats to the public health and safety.

Emergency plans are prepared in response to the requirement of the California Emergency Services Act which requires counties and cities to adopt emergency preparedness programs.

Recommendation #39. Highway 101, to the north and south, Blue Slide Road to the west, and Monument Road to the west should be considered the evacuation routes from the planning area. Bellview Avenue, Wildwood Avenue and Davis Street are the primary evacuation routes within the city. These routes should be kept passable in major emergencies recognizing that the type and location of the disaster will determine which will be most needed. The paved areas in front of the Rio Dell Elementary School should be designated as an emergency helicopter landing area, in the event that all surface routes are closed.

Recommendation #40. The contingency plans listed below and in the following recommendations should be available in City Hall for reference and communication during disasters: (1) Humboldt County Flood Plan; (2) Water Quality Emergency Notification Plan; (3) Accidental Sewage Discharge Plan; and (4) The City of Rio Dell Civil Defense Plan.

Recommendation #41. Either as part of an existing contingency plan or separately, plans should be developed to include earthquake emergency considerations such as an alternate water source, and housing for residents of homes rendered unsafe by an earthquake.

Recommendation #42. Carelessness with electrical appliances and other fire hazards, safety hazards in the home, and ignorance of what should be done during an earthquake or other disasters can all be reduced by providing information to the general public. Hazard reduction information is

particularly effective when presented in the schools. Public Safety officials should continue to work with school administrators to insure that this important information is reaching the students and that frequent drills are conducted to illustrate appropriate disaster response at school.

Environmental Assessment. This policy is aimed at the mitigation of future disasters. Failure to make provisions for the safety, education and disaster preparedness of school children and the general public would be an adverse impact of a "No Policy" alternative. The risks addressed cannot be so low that contingency plans can be neglected.

Recommendation #43. The city should review the existing house numbering system to determine if existing confusion in certain areas can be remedied. Consistent addressing is important to agencies responding to emergencies.

Implementation

The Public Safety Element includes 43 recommendations which call for some type of implementary action by one or more city departments or other agencies. Each recommendation identifies the responsible person or agency whenever possible. However, time and resources are limited and it is expected that each city department will need to establish a phased implementation program with the City Council providing guidance on priorities. To assist in evaluating the implications of each recommendation a list of pertinent recommendations with some comments on implementation strategy are provided below for each affected agency.

Building Inspector. Recommendations 1, 2, 3, 4, 10, 11, 19, 20, 21, 24, 25, 30, 31 will be of most direct concern to the City Building Inspector. Several of these recommendations call for a cooperative implementation effort between the inspector and Fire District personnel. Most are related to the need to inspect certain hazardous situations, and may require more field work than is currently necessary. Because these activities will involve inspecting private property, the inspector will need to understand the reason for his activity so he can explain the program to concerned property owners. Support from the City Council will be important. The policies contained in these recommendations can also be incorporated in the building permit review procedure to ensure that new construction conforms to the adopted safety standards.

Public Works Department. Recommendations 3, 4, 5, 6, 7, 9, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 32, 33, 34, 35, 38, 39, 40, 41 and 43 touch some phase of the Public Works Department's responsibilities. In several instances the staff will be assisting the Planning Commission and the City Council in eliminating hazards during the design phase of private development. Other actions, particularly in the area of street maintenance and maintenance of the water and sewer system, may already be incorporated

in standard operating procedure and a periodic review of the recommendations to ensure their continued application may be all that is required. Several other recommendations will require specific study of problems by the staff, and possibly the city engineer, with specific implementation recommendations being submitted to the City Council for authorization. Some of the proposals will no doubt involve minor to major construction projects with commitments of city funds and possible financial involvement by affected property owners. These projects can only be accomplished if the staff and the City Council carefully establish priorities and budget the necessary funds. Funding assistance from state and federal agencies may well be available and should be pursued, to supplement the city's limited financial resources.

Planning Commission. The policies expressed or problems identified in Recommendations 3, 6, 17, 19, 22, 25, 26 relate to land use issues which are considered by the Planning Commission. Periodic review of these problem areas and the suggested means of correcting them should enable the Commission to detect potential hazards during the permit review process. If they can be eliminated at this point the risks incurred by the city and affected property owners in the future will be lessened.

The Public Safety Element, as a whole, is of particular interest because the Commission is responsible for the General Plan and should review it periodically to see if it still addresses pertinent problems and serves the community's interests. In the course of its review, the Commission can determine from city staff and other agencies what recommendations in this element have been implemented, and which have not and why. If new problems are uncovered they can be added, and unimplemented recommendations can be revised.

Fire District. Many of the recommendations in the Public Safety Element are of direct concern to the Fire District (see Recommendations 2, 8, 9, 10, 11, 12, 13, 14, 15, 20, 24, 25, 26, 28, 29, 30, 38, 39, 40, 42, 43). The first group of recommendations relate to hazard identification and the provision of adequate fire fighting capacity. The last few recommendations are concerned about preparedness for major emergencies. Because of their training and public safety responsibility the Fire District staff is directly involved in disaster preparedness efforts. The Fire District budget is limited and the staff is all volunteer so it is important that the District develop a phased implementation program based on a prioritization of the various recommendations. Although not as exciting as fire fighting, fire prevention activity and disaster preparedness can reduce the frequency of major fires and make fire protection less expensive in the long run. Maintaining good community relations and dynamic volunteer interest in the district is essential to the accomplishment of these objectives.

Police Department. The traffic safety and emergency preparedness recommendations will be of direct concern to the Police Department (see Recommendations 14, 15, 16, 17, 18, 19, 20, 39, 40, 42 and 43). The Department can be of particular assistance to the street maintenance staff by identifying locations where improvements such as centerline striping, edge markers, repair of dangerous surface conditions, etc. could reduce driving hazards. The police staff will also need to be informed about the activities of the fire district and other public safety agencies to ensure coordinated response in time of emergency.

School District. The School District will be involved in the implementation of Recommendations 36 and 46 in particular, although other recommendations in the report may be helpful to the District in suggesting ways that hazards can be reduced on the school premises. Both the Public Safety and Noise Elements place great emphasis on the role of education in the effort to reduce hazards. The school system is well suited, with the assistance of public safety personnel, to present this information in a convincing and interesting manner.

City Council. By its adoption of the Public Safety Element, the Council is indicating to its staff and affected agencies what City policy is, and what it hopes to do in the way of hazard reduction and emergency preparedness. General Plan elements are intended to provide general direction, so implementation will necessarily involve further study, consideration of staff input, decisions on priorities, implementation strategy, funding, and efforts at coordination with other involved entities. Without the continuing support and interest of the City Council, implementation efforts will lag and the full benefits to the City and the public will not be achieved. An early decision on priorities and specific instructions to affected staff will demonstrate the Council's interest in implementing the Plan. Many of the recommendations suggest incorporation of new policies and procedures into existing staff activities and should not require additional staff. A few recommendations will necessarily involve shifting staff away from less important matters for a time, and may also require diversion of some funds. The temptation to give preventive actions a lower priority and to concentrate on other more immediate problems should be resisted.

Humboldt County. As noted in the introduction, Humboldt County will consider these recommendations during the development of the County Public Safety Element. It is expected that they will cooperate with the City of Rio Dell in the implementation of policies and programs near the boundary of the planning area. Maintenance of good communication between city and county staff is essential to the implementation of a coordinated program.

Public Utilities. Recommendations 23, 28, 32 and 34 affect local public utility companies. The Pacific Telephone Company and Pacific Gas and Electric Company are most directly affected. The problems cited in these recommendations are often detected in the course of regular utility inspection programs. However, when special problems occur the City Public Works staff can assist by notifying the appropriate utility of the hazard.

APPENDIX A

RIO DELL AREA SEISMIC CONSIDERATIONS

General Structural Geology and Geologic History

The Rio Dell planning area is situated in the middle of a 12,000 foot sequence of northward tilted marine mudstones and sandstones--the Wildcat group--which was deposited in a southeast trending marine embayment during an approximate time span between 18,000,000 and 3,000,000 years ago. This sequence was laid down unconformably on a surface of dense Yager mudstones and sandstones, deposited in a deep sea trough that paralleled the west coast approximately 50,000,000-90,000,000 years ago. Thickness of the Yager is unknown but undoubtedly many thousands of feet. Nearest surface exposures of the Franciscan are east of the Freshwater fault, 12 miles east of Rio Dell.

Severe deformation and disruption of the Franciscan Complex during its deposition was followed by less intense deformation of the Yager, then a long period of uplift and erosion. The marine embayment in which the Wildcat strata were deposited formed as a depression trending southeastward across this erosion surface. Sedimentary filling of this trough by the end of the Pleistocene (about 2,000,000-3,000,000 years ago) was succeeded by a period of northward tilting of the Wildcat sediments. The ancestral Eel River may have already been flowing in its present course following the trend of the filled trough, and was gradually inset into the ridges (Scotia Bluffs, etc.) as they rose across the trend of the river. It is likely that slow northward tilting continues today, associated with downwarping of the Eel River Valley.

Philosophy of the Analysis

The western portions of Humboldt County, and adjoining offshore areas, are regions of moderate to high seismicity. Plate I shows the location of major known Plio-Pleistocene Faults (those with movement within the last two to three million years). Except for the Cape Mendocino area, no obvious patterns emerge tying earthquakes to particular faults or shear zones. The only known historical surface rupture associated with a fault in the area was in

1906 along the San Andreas Fault in southern Humboldt County, at Shelter Cove and Upper Mattole. That fault is therefore obviously active.* The frequent earthquakes south and southwest of Ferndale are taken to indicate modern activity along the Cape Mendocino-False Cape shear zone, and its seaward extensions.

Elsewhere in the area no faults can be demonstrated to be unequivocally active, but several should be viewed with considerable suspicion. Even the source fault of the strong 1954 "Humboldt Bay" earthquake (M=6.5) has not been clearly identified. Therefore it behooves us to establish a philosophy by which to deal with the inadequacy of the data. Since structural engineers require quantitative information in their design work, we have attempted to arrive at reasonable "best estimates" based on this sparse data. In order to provide figures for the maximum probable earthquake, we have used the approach described in the following section.

Maximum Probable Earthquake

Paramount to the assessment of seismic risk and development of seismic safety criteria is the determination of the Maximum Probable Earthquake (MPE): the strongest earthquake which is possible within the confines of the existing geologic setting and has a reasonable probability of occurring during an interval of time consistent with the useful life of structures and developments in the planning area. In this study the MPE has been calculated for a 100 year interval, and thus should be interpreted as the strongest earthquake likely to occur on a given major fault during any 100 year period. It does not represent the strongest earthquake possible on that fault or in that region, but earthquakes with higher magnitudes are more widely spaced in time.

Determination of the Maximum Probable Earthquakes on faults affecting the planning area is based on a statistical analysis of the seismic history of the region surrounding the planning area and an evaluation of geologic features, including faults, related to earth movements caused by earthquakes. The western portion of Humboldt County, and adjoining offshore area, have been characterized during the past 100 years by frequent small to moderate and occasional large earthquakes. Two areas of different seismic character are present. The northern seismic area, characterized by moderate seismic activity, extends northward through western Humboldt County from the lower Eel River Valley. The southern seismic area, a

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*The California Council on Intergovernmental Relations in the General Plan Guidelines (Anderson, 1973) defines an active fault as: "A fault that has moved in recent geologic time and which is likely to move again in the relatively near future. For geologic purposes there are no precise limits to recency of movement or probable future movement that define an "active fault." Definitions for planning purposes extend on the order of 10,000 years or more back and 100 years or more forward. The exact time limits for planning purposes are usually defined in relation to contemplated uses and structures."

region of substantially higher seismic activity, includes the southwestern portion of Humboldt County south of the Eel River and the offshore area adjacent to Cape Mendocino (Plate I). Differences in the seismic characteristics, particularly the frequency of small to moderate earthquakes in the two areas, has resulted in separate analyses for each area. Results of these analyses are shown on Figures 1 and 2.

Both the northern and southern seismic areas contain many active or potentially active* faults, although many of these are short fault segments. At least four major faults or fault zones are present in the northern seismic area and at least three distinct systems of large active or potentially active faults are present in the southern area. Since large magnitude earthquakes (Richter magnitude = 6.0±) involve faulting along many miles of fault length, future large magnitude earthquakes in the region surrounding the planning area can be expected to occur on these large faults or fault zones. Although geologic evidence of fault movement suggests that certain of these zones may be characterized by higher levels of activity, insufficient information is presently available to allow quantitative assessment of the level of activity of any individual fault or zone. In this analysis the MPE is therefore assumed to be a credible seismic event capable of originating on any of these active or potentially active zones. Calculations of bedrock accelerations in the planning area for Maximum Probable Earthquakes have been based on minimum surface distances to the fault zones (Table I). Surface distances are justifiably used because it is likely that MPE's will be accompanied by surface rupture along the fault trace.

Limitations of This Analysis

This assessment of the seismicity and seismic characteristics of the western Humboldt County region is based on a review of published and unpublished information from a variety of sources. Although limited data are available from previous studies, much information is the result of reconnaissance investigations and is somewhat general. No attempt has been made to check or refine published information, and little new data have been generated for this study. Relatively sparse detailed information concerning seismic geology of the region is available from previous studies. Additional detailed work would allow refinement of the results presented in this report. However, such work is costly and was not possible within the financial constraints of this study. It is our belief that such efforts would not have significantly changed the results.

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* The Association of Engineering Geologists has defined a potentially active fault as "one along which, based on available data, no known historical ground surface rupture or earthquakes have occurred. These faults, however, show strong indications of geologically recent activity".

or lack of it. These faults, and their closest approach to Rio Dell, are as follows: Mattole Shear zone: 12 miles southwest; Little Salmon-Yager fault: 5 miles northeast; and Freshwater fault: 12 miles east. (See Figure and Table I). Estimates of the magnitude recurrence intervals, ground accelerations, and the duration of strong shaking that would be expected in the planning area by major slippage on these faults are listed in Table I.

Active or Potentially Active Faults Within Limits of Planning Area

Field checking and close scrutiny of aerial photographs, together with a review of existing literature, maps, and unpublished work, indicate that there are no recognized faults within the limits of the planning area. Therefore there is no anticipated danger from surface rupture along a fault or shear zone. Indirect damage could result from surface rupture associated with landslides or other surficial movements triggered by a strong earthquake (see below).

Evaluation of Stability Problems Within Planning Unit Associated With Nearby Earthquakes

Mass Movement on Hillslopes

Mass movement of material on hillsides is a major accompaniment of moderate and strong earthquakes. This may be in the form of landslides, rock avalanches, mud and debris flows, or other types of slope failure. Steep natural or artificial cuts subjected to a moderate or strong earthquake during the wet season often undergo failure. Continued modification of the topography by further cut and fill would increase the landslide potential in hillside areas.

A stability map has been prepared to delineate stable areas from those with stability problems. This is generalized and meant to indicate those areas where further slope stability investigation should be made if subdivisions or "critical"* structures are proposed for those areas. Boundaries between adjacent sectors are inexact and only meant to delineate the zones in a general way.

Areas of low slope stability are present in the hills west of town where moderate to steep slopes are associated with unstable bedrock or soil conditions. Road construction and timber removal have aggravated the problem. Additional areas of localized instability lie along and adjacent

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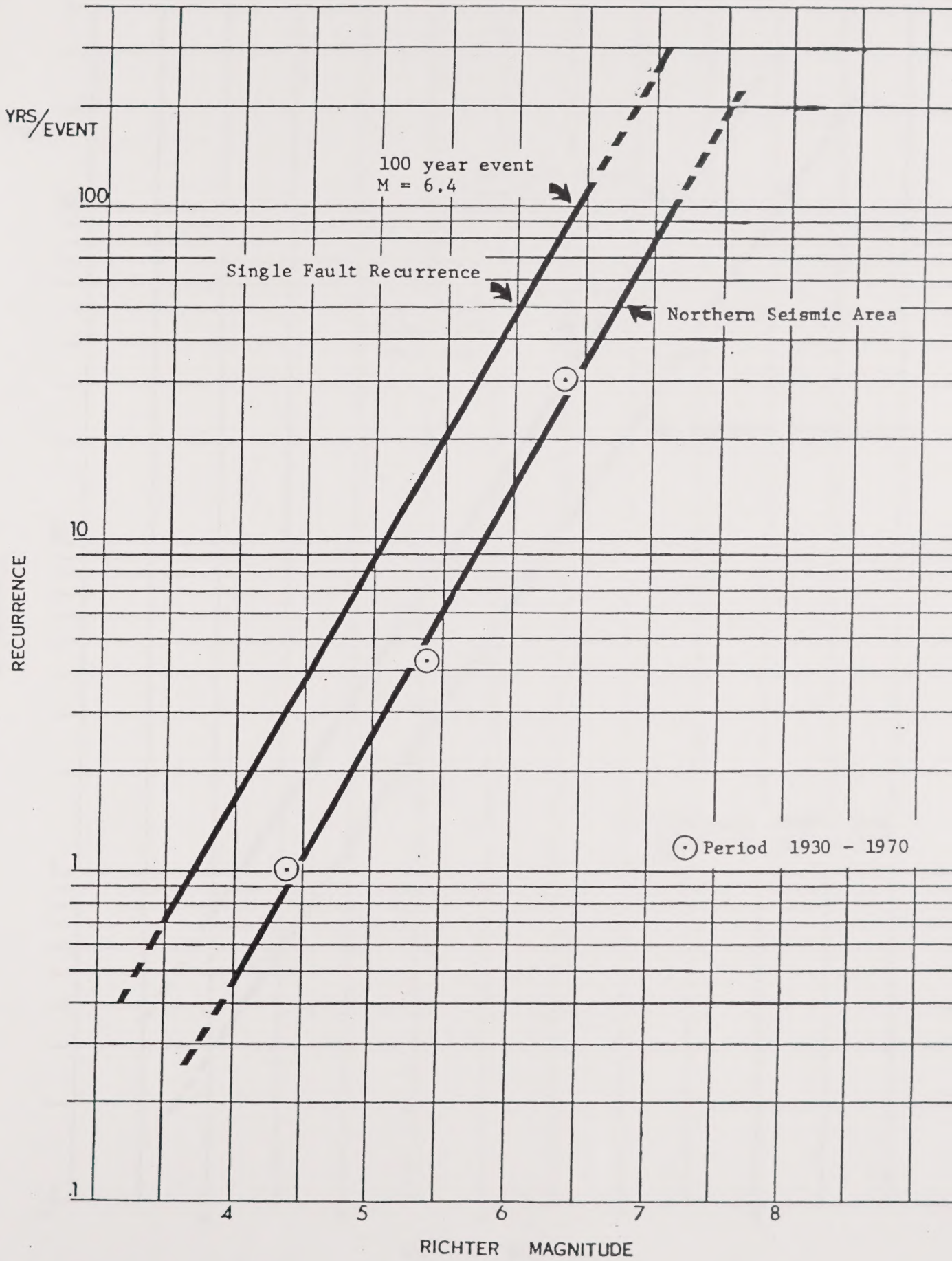
* "critical structures" would be hospitals, schools, other high occupancy structures, high cost facilities, and facilities vital in emergencies.

Differential Subsidence or Settlement

Differential subsidence or settlement may occur in underconsolidated materials during shaking, associated with the induced tendency toward a more compact arrangement of the grains. As the porosity is decreased, pore water may be forced to the surface to form sand boils or mud spouts. Ground settlement often leads to tilting of buildings or differential settlement of other engineered structures.

The coarse nature of the alluvial materials underlying the Rio Dell planning area would tend to diminish the tendency for this kind of ground disturbance during a severe seismic shock and it is not believed to constitute a major problem in the area.

FIGURE I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RECURRENCE
100 year event
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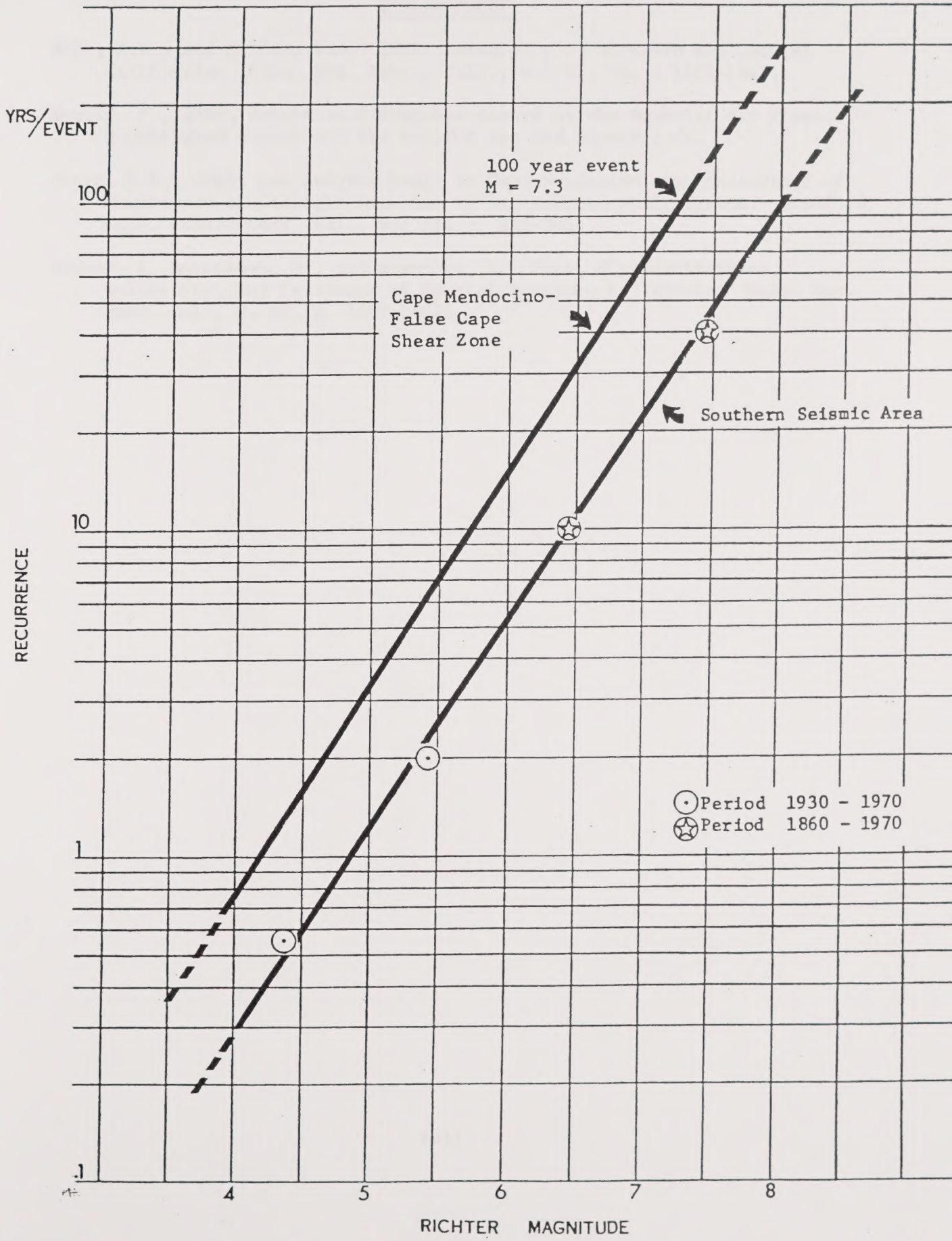
Single Fault Recurrence
Northern Seismic Area
Period 1930 - 1970
4
5
6
7
8
RICHTER MAGNITUDE

FIGURE II


YRS/EVENT
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10
1
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RECURRENCE
100 year event
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Cape Mendocino-
False Cape
Shear Zone
Southern Seismic Area
Period 1930 - 1970
Period 1860 - 1970
4
5
6
7
8
RICHTER MAGNITUDE

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APPENDIX B

FIRE LIMITS

The American Insurance Association encourages cities to implement fire limits in closely built commercial areas to reduce the incidence of fire spreading from building to building. In their report the "Recommended Method for Laying Out Fire Limits" (September, 1956) they indicate that a single class of fire limits which establish supplementary restrictions on construction within such limits is their recommended approach.

The following comments summarize the major points contained in their booklet:

1. Fire limits should include all closely built areas of predominantly business or commercial occupancy, together with surrounding blocks or portions thereof on all sides (usually a belt not less than 200 feet wide).

2. The outer belt is for the purpose of protecting the closely built area against serious exposure fires starting in the outer belt or beyond. Protection of the buildings within the outer belt from fire hazards is a secondary benefit.

3. Any areas of two or more adjoining blocks should be considered large enough to warrant fire limits protection.

4. Areas of developing commercial occupancy should be included within the fire limits.

5. Where a zoning ordinance has been adopted, the fire limits should be correlated with areas designated for commercial occupancies but it is seldom necessary or desirable to include all commercially zoned areas within the fire limits.

6. Suitable code provisions restricting construction within fire limits are contained in the Uniform Building Code. The code restricts wood frame construction within the fire limits to certain small area, low height structures. Unprotected non-combustible construction is restricted to a somewhat lesser degree.

The specific implementation of fire limits should be evaluated to determine if the restrictions encourage construction of more earthquake damage prone types of buildings. If so, the trade-offs between reduced fire hazards and possible increase in earthquake hazards should be weighed. Implementation of a fire limits system should result in reduced fire insurance rates for affected structures and an improved fire rating for the community as a whole.

APPENDIX C

OFF-STREET PARKING POLICY

The following is suggested for consideration as a policy regarding existing buildings and land uses with or without off street parking. Such a policy should be incorporated in the zoning ordinance.

Off street parking facilities existing on the date this policy is adopted, incidental to a building or land use, shall be considered the required off street parking for that specific use or building, even though it might not conform to the off street parking requirements of the zoning ordinance. Any change in the use, the building or the parking facilities is subject to the following:

1. Existing off street parking as described above, shall not be abandoned, reduced in area or redesigned so that the facility is less in conformance with the provisions of the zoning ordinance in any respect, unless an equivalent number of off street parking spaces, or the number of parking spaces prescribed for that use or building in the zoning ordinances is provided as required in the zoning ordinance.

2. If a building or use is expanded, off street parking as required by the zoning ordinance shall be provided for the expanded portion of the building or use. Any existing parking shall conform to the requirements of item 1.

3. If the use of land or a building is changed to a use with a greater parking requirement, as specified for the previous and the new use in the current zoning ordinance, off street parking equal to the difference between the two requirements shall be provided as required by the zoning ordinance and any existing off street parking shall conform to the requirements of item 1.

4. Where no suitable locations are available due to building congestion or unwillingness to sell, the city should offer to utilize its property condemnation authority with the affected building owner paying for the amount of property and improvements necessary to meet his off street parking requirement. The owner then donates his share of the project to the city to be maintained as a public parking lot. The city could grant temporary waivers of the off street parking requirement for short periods while the participation of other owners of existing buildings is sought to help finance the project.

   Another alternative would be the formation of a downtown improvement district which could collect funds to acquire and develop off street parking. If this was accomplished the above policies could be modified to exempt those buildings whose owners participated in the project.

   Another alternative is to scale back the new uses to conform with the amount of off-street parking presently available.